MOULDING ELEMENT FOR MOTOR VEHICLE BODIES AND METHOD FOR THE REALISATION THEREOF

The present invention relates to a moulding element for motor vehicle bodies and a method for the realisation thereof.

In particular, such a moulding element is destined to be applied as a finish and/or protection to car body parts (e.g.: doors, fenders, edge areas of the lower perimeter of the body, windshields, etcetera).

Moulding elements of known types for the uses cited above usually comprise a band, typically made of plastic material, provided with proper attachment means for engagement to some part of the body.

It is known from DE 4217513 a moulding element composed by two parts: a frame, attached to the body, via adhesive tapes and studs projecting from the frame; an outer cover snap-fitted on the frame.

In is also known from EP 0461576 a single piece moulding element, provided on its inner surface with slots properly shaped to engage projections emerging from the body.

Some known types of moulding elements provide for the plastic band to be fastened by means of adhesives (e.g.: bi-adhesive tapes interposed between the body and one side of the moulding element).

The drawbacks of this kind of fastening are clear: precariousness of the connection, unreliability over time, extreme sensitivity to atmospheric agents and to dynamic stresses.

A second known type of general architecture for moulding elements provides for the presence of a longitudinal seat destined to house, by snap-on engagement, a plurality of coupling elements which are positioned in the longitudinal seat in

mutually equidistant positions.

More precisely, the moulding element comprises an elongated main body, obtainable by means of extrusion or moulding, wherein the longitudinal seat is defined. The latter, on the side of the moulding element destined to be oriented towards the body, presents an opening or slot wherefrom the coupling elements can partially emerge. More specifically, in correspondence with the opening or slots, millings or blankings are obtained at regular intervals in order to allow the insertion of each of the coupling elements and, at the same time, to define axial bearing surfaces wherein the coupling elements go and get locked by snapping.

Once the various coupling elements are appropriately fastened, they will each present at least a projection emerging in a direction substantially perpendicular to the longitudinal seat to engage corresponding slots obtained on the body of the motor vehicle.

This prior art realisation, though it is certainly effective from the point of view of fastening and operative reliability, has nonetheless also shown considerable drawbacks.

In particular the need to realise millings for the access of the engagement elements in correspondence with the longitudinal seat clearly entails an additional working phase which causes non negligible manufacturing costs. Moreover, since the main body whereon the milling is performed is typically made of material having good mechanical characteristics and, oftentimes, even of bi-material, milling operations are certainly not easy.

It should also be noted that the milling or blanking operations cause significant weakening in the structure constituting the moulding element thereby inevitably causing deformations and in particular undulations, certainly anti-aesthetic, which reduce the planarity and compliance with geometric tolerances of the outer surface of the moulding element itself. In fact, given the extreme rigidity of the section bar and the presence, in many cases, of metal cores, the milling work processes may entail such maintenance problems to the abrasion elements as to determine high machining costs and scrap levels.

Moreover, the residual presence of possible burrs can determine abrasions and scoring on the painted parts of the body.

In the attempt to solve the aforementioned drawbacks, a third type of moulding elements is currently widely used, wherein the attachment means comprise rivets or projections fastened, for instance by welding, to the body of a motor vehicle and then appropriately coated with plastic material in order to be engageable, by interference or by snapping on, in corresponding seats of the moulding element.

In greater detail, each rivet of the body is provided with its own plastic retaining element presenting a seat able to receive, by means of insertion in the vertical direction, the head of the rivet.

Each retaining element is also provided with guiding portions with horizontal development located on the same element in opposite positions.

Once each head of the rivets is engaged with the corresponding retaining

element, a "C" section bar is associated by sliding, which engages on the guiding portions and covers the retaining elements themselves. By means of terminal bodies the axial sliding movement between section bar and retaining elements is subsequently prevented.

This last realisation, although it does eliminate the burdensome problem of the milling operation, is also afflicted by some drawbacks.

In the first place it should be noted that it is not possible to manufacture a finished product ready to be assembled to the body of the motor vehicle.

This is because the assembly phases entail first associating all the retaining elements to the respective rivets.

Secondly, it is necessary to engage, by means of sliding, the extruded element to each of the retaining elements, and hence an additional phase wherein the section bar is axially locked is necessary.

This means that mounting each moulding element requires numerous successive phases and that prior to proceeding with assembly to the body, each moulding element must be finished in multiple separate pieces.

It should also be noted that the presence in the finished product of a plurality of discrete elements (retaining elements) physically separated from each other, coupled with the weakness of the section bar structure, due to the presence of hollow lightening areas, contributes to render the final structure of the moulding element weaker and more easily deformable.

In this situation, the fundamental aim of the present invention is to make available a new embodiment of a moulding element for motor vehicle bodies

which, in addition to presenting high performance in terms of resistance and reliability over time of the fastening to the body, is also economical to manufacture and easy to assemble, without thereby entailing substantial increases in terms of materials consumption.

A further aim is to avoid the need for milling operations on the extruded section bar whilst allowing to realise such a moulding element as to be able to be associated to the body of a motor vehicle with simple operations also engaging each of the rivets emerging from the body of the motor vehicle to a corresponding seat with a single attachment operation.

Within the scope of said technical task, an aim is to provide motor vehicle manufacturers with an already pre-assembled moulding element, requiring only to be fastened to the motor vehicle.

Lastly, a further aim is to render the moulding element able to be fastened to the body in a more resistant and reliable manner.

These and other aims besides which shall be made clearer in the course of the following description are substantially attained by a moulding element as described in the accompanying claims.

Further features and advantages will become more readily apparent from the detailed description of a preferred, but not exclusive, embodiment of a moulding element according to the invention.

Such description shall be made hereafter with reference to the accompanying drawings, provided purely by way of non-limiting indication.

-Figure 1 is an interrupted plan view relating to the body coupling side of a

moulding element according to the present invention;

- Figure 2 is a cross section according to trace II-II of Figure 1;

- Figure 3 is an interrupted top view of a continuous support element according to the invention;

- Figure 4 shows a longitudinal cross section according to the axis IV-IV of the continuous support element shown in Figure 3;

- Figure 5 is a cross section of the continuous support element according to the trace V-V of Figure 3;

- Figure 6 is a cross section of a continuous support element according to the trace VI-VI of Figure 3;

- Figure 7 shows an alternative embodiment of a continuous support element according to the present invention; and

- Figure 8 shows a cross section of the continuous support element of Figure 7 engaged to a projection emerging from the body of an automobile.

With reference to the accompanying figures and in particular to Figures 1 and 2, the number 1 indicates in its entirety a moulding element of motor vehicle bodies.

As mentioned above the moulding element 1 may be employed as an element for protecting, for surface and aesthetic finishing, for covering in various areas of the body of a motor vehicle, for instance in correspondence with the lower edge of the body on the sides thereof, in correspondence with the front and rear fender, on the doors, on the windshield, etcetera.

The moulding element 1 comprises a main section bar possibly provided with

metal core presenting elongated conformation and obtainable for instance by means of extrusion or pultrusion or other processes.

The main section bar presents an outer side 2a whereto is associated a surface finish coating 3 which, needing to be rigidly coupled to the main body itself, can preferably be joined thereto by means of injection moulding techniques or in co-extrusion with the main section bar. Preferably, but not necessarily, the main section bar can also be provided with a flexible seal lip 4 extending substantially along the entire longitudinal development of the moulding element 1 and presenting a base portion 4a rigidly engaged to the main section bar 2. From a manufacturing point of view, the coupling between the main section bar 2 and the seal lip 4 can be obtained with various techniques, for instance by means of their co-extrusion effected continuously.

In order to engage the main section bar 2 and thus the moulding element 1 to a corresponding attachment area 5a provided with fastening projections 9 welded to the body 5 of the motor vehicle, attachment means 6 are provided, operatively associated to the main section bar itself in correspondence with an inner side 2b thereof, opposite to said outer side 2a.

In detail, the fastening projections 9 comprise a pre-set number of elements each provided with a head connected to the body 5 by means of a stem with smaller radial dimensions than those of the head, resembling the shape of a rivet.

Originally, the attachment means 6 comprise a continuous support element 7, extending substantially over the entire longitudinal development of the main

section bar 2 and fastened thereto preferably by means of insertion in a corresponding longitudinal seat 8 obtained on the inner side 2b of the main section bar itself.

Descending further in detail, it should be noted that the longitudinal seat 8 is defined by the main section bar which presents a substantially "C" shaped cross section. The seat is obtained on the main section bar 2 and it presents, in its cross section, a longitudinal opening 10, also substantially developing over the entire length of the moulding element, set to allow an access to the continuous element 7 when the latter is inserted.

Also in reference to the cross section, the longitudinal seat 8 presents at least an undercut 12 set to act in opposition against a corresponding bearing portion 13 of the continuous support element 7 to prevent its extraction through the longitudinal opening itself. It should be noted that, in the example shown, for reasons of symmetry, two undercuts 12 are preferably provided, co-operating with respective bearing portions 13. In practice, both the continuous support element 7 and the longitudinal seat 8 present, at least for pre-set lengths, a greater transverse size than that of the longitudinal opening 10 so that the continuous support element 7 can be housed in its seat 8 without being extractable therefrom through the longitudinal opening 10.

Actually, to allow the attachment means 6 to be coupled to the main section bar 2 during the assembly phase, it is provided for the longitudinal seat 8 to present, in correspondence at least with one of its ends, an insertion opening 8a to receive the continuous support element 7 which can traverse the

insertion opening itself and can be made to slide in the seat 8 until reaching the desired axial positioning. Once the attachment means 6 are suitably positioned with respect to the main section bar 2 the continuous element is fastened axially by means of axial locking means 14 (Figure 1) operatively interposed between the main section bar itself and the continuous support element. More specifically, such axial locking means can comprise conventional locking organs for instance of the threaded kind or a slot, for instance with dovetail undercut, destined to receive a corresponding portion integral to the main section bar. Note that in the embodiment shown the finish coating 3, once rigidly associated to the main section bar 2, will present a portion destined to be inserted in the axial locking slot obtained on the continuous support element to lock it in the axial sense. With reference now to the particular structure of the attachment means 6, it should be noted that the continuous support element 7 presents a pre-set number of attachment seats 11 (in particular more than one seat and in general in a number equal to that of the projections) positioned at a pre-set mutual distance. The seats 11 are distanced correspondingly to the distance between the fastening projections 9 presented by the motor vehicle body and are provided with means for axially locking the head of the projections 9.

In a first embodiment shown in Figures 1 through 6, each seat 11 is a through seat and it is delimited, at least in one side of the continuous element 7 destined to face the body, by a peripheral lip defining a closed line. Such peripheral lip defines at least an area of insertion 11a so conformed as to

allow the passage of the head of the projections 9 traversing the continuous element 7. The lip also defines a second blocking area 11b of such dimensions as to allow the passage of only the stem of the rivet 9, preventing the head of the rivet from axially crossing through, moving away from or towards the body.

Once the head of the rivet 9 has been inserted in the insertion area 11a according to a direction that in the figures shown is axial (but which may coincide with any other direction), the rivet is moved in the blocking area of the seat wherein the moulding element is prevented at least from moving in axial direction away from the body.

In correspondence with the blocking area the peripheral lip presents a projecting portion 15 which defines at least an undercut 16 set to act in opposition with the corresponding arresting portion of the head of the projection 9 to prevent the aforementioned displacements.

From a procedural point of view, coupling to the motor vehicle occurs by simultaneously inserting all the heads of the fastening projections 9 through the first zone 11a of the engagement seats 11 and then effecting a translation of the moulding element according to a direction parallel to the axis of longitudinal development 17 of the section bar, thus bringing the heads to interfere with the continuous support element 7 in correspondence with the second area 11b of the seats.

In this situation any force directed to separate the moulding element from the wall of the vehicle brings the bearing portion of the head to interfere with the

undercut 16 of the seat thereby preventing detachment.

A second embodiment, shown in Figures 7 and 8, provides for the presence on the continuous support body 7 of seats 11 delimited by an open profile so as to be connected to the preceding seat and to the subsequent seat (excluding respectively the first and the last seat).

Also in this configuration the seats are provided with two areas, one 11a destined to the insertion of the head of the rivet and one 11b destined to interdict the separation movement of the moulding element from the body. The blocking area 11b is also provided with undercuts 16 acting in opposition against the head of the rivet 9 once the parts have been assembled.

The assembly and operation of this second type of continuous element conforms absolutely to the one described above.

It should be noted that the need to realise different types of elements can be linked for instance to the fact that sometimes the projections of the motor vehicle are covered by means of coating clips 18 (see in particular Figure 8) which increase and modify the dimensions and geometry of the attachments thereby forcing the use of seats of different kinds. Obviously, by appropriately varying the dimensions, also the first type of continuous elements can be adapted for use even in case of employment of clips for coating the rivets.

Lastly, from the point of view of the materials, it should be noted that the continuous support element 7 can be realised, for instance by means of moulding or by means of extrusion and subsequent removal of material, with:

- polyoxymethylene;

- acetal resins;
- reinforced polyamides;
- thermoplastic or heat-hardening materials possibly reinforced with fibres of various nature, suitable for the purposes;
- metal alloys.

In turn, the main section bar 2 and the coating 3 can be realised respectively of extruded PVC compounds with metal core or fibres, or any other thermoplastic or heat-hardening material or cured rubbers suitable for the purpose, reinforced with fibres or metal cores or not so reinforced, as well as for instance soft PVC compounds the better to absorb any impacts, or any other thermoplastic or heat-hardening material or cured rubber suitable for the purpose.

The realisation of a moulding element according to the invention entails a phase wherein a "C" shaped section bar 2, possibly incorporating a reinforcement core, is extruded.

To the section bar 2 can be associated by means of injection moulding, or even in co-extrusion process, a finish coating 3 and/or a flexible sealing lip 4.

Also prepared is a continuous support element 7 (by means of forming, by means of extrusion and subsequent milling, or by yet another technique) provided with attachment seats 11 which is engaged to the main section bar by insertion into the cavity of the section bar until reaching the desired axial position.

Lastly through the use of the axial locking means 14 described the relative

sliding movements of the components comprising the moulding elements are interdicted.

At this point in the procedure, the product according to the invention is ready to be fastened to the body.

The invention attains important advantages.

In the first place, it should be noted that the moulding element according to the present invention substantially solves all the typical drawbacks of prior art realisations whilst assuring effective fastening, high operative reliability as well as reduced costs both to manufacture and to assemble the various elements comprising it.

In particular, it should be noted that all the milling and/or blanking operations necessary for correctly fastening the attachment means 6 to the main section bar are substantially eliminated.

Moreover, thanks to the particular conformation of the continuous element 7 provided with a plurality of engagement seat, with a single operation it is possible to position such seats in correspondence with all the projections of the body with considerable savings in terms of assembly time.

In addition to its economising in construction and assembly times, the subject moulding element 1 is extremely effective also because the absence of material removal operations substantially eliminates structural weakening problems and, above all, it excludes the possibility that permanent deformations or undulations be induced on the substantially finished piece.

Moreover, the particular structure of the various components allows to pre-

assemble the moulding element prior to fastening it to the body, so that it can be delivered to manufacturing companies already finished and ready for application.

In conclusion, therefore, the moulding element according to the invention is obtainable at reduced costs, though it reaches a level of quality both in terms of compliance with geometric tolerances and in terms of mechanical resistance that is difficult to reach with prior art systems without prohibitive costs.